Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of

Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions	))))	Docket No. 12-268

Reply Comments of Shared Spectrum Company

March 12, 2013

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REPLY COMMENTS OF SHARED SPECTRUM COMPANY

I. INTRODUCTION:

Shared Spectrum Company (SSC) is a leader in developing spectrum sharing technologies including Dynamic Spectrum Access (DSA) radios, frequency sensors, and software applications. SSC filed Comments in this proceeding in which SSC applauded the Commission's effort to develop rules for more efficient use of the VHF and UHF TV bands on a shared basis.

In its Comments, SSC noted that sharing can be accomplished in a manner that will promote innovation in this band and ensure that Broadcast licensees do not experience harmful interference. Sensing technologies, in particular, can play a large role in maximizing the efficient use of this spectrum band.

II. REPLY COMMENTS OF SHARED SPECTRUM COMPANY, INC.:

SSC supports those comments which favored the addition of sensing technology to augment geo-location databases. In addition, SSC supports the use of cognitive radios, such as Dynamic Spectrum Access (DSA) radios. SSC agrees with those comments which advocate higher power for these devices than currently allowed in the TV White Spaces (TVWS) rules. SSC favors large guard bands, rather than small guard bands, and a "use it or share it" approach to licensed bands.

A. Sensing Should Play an Increasing Role in Spectrum Sharing.

SSC concurs with the comments of Spectrum Bridge, Inc., one of the leading database administrators, on the proper role of sensing technology going forward. Spectrum Bridge stated that geo-location databases "should leverage intelligence in the radios" themselves, *including sensing information*, to provide more spectrum to unlicensed users.[1]

SSC agrees that sensing should play a greater role in spectrum sharing in this, and nearly all, bands. The Commission should continue to promote such use of sensing technologies in conjunction with geo-location databases, as a way to further reduce the possibility of interference between licensed and unlicensed users, while maximizing efficient use of both licensed and unlicensed spectrum.

B. Cognitive Radios such as DSA Should be Allowed, and at Higher Power.

Sensing technologies such as cognitive radios, and DSA in particular, can better enable sharing *among* unlicensed users and *between* licensed and unlicensed bands.[2] The White Space Alliance referred to the benefits of using cognitive radios to maximize use of the unlicensed bands.[3] The White Space Alliance listed several examples of recent TVWS deployment and testing by Adaptum, Spectrum Bridge, and others, including a recent successful test in rural Virginia.[4] For its part, cognitive radio maker xG

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[1] Spectrum Bridge at 5.
[2] DSA is one type of cognitive, or smart, radio. A DSA radio senses its environment, noting the use of frequencies in a given time and place, and assigns itself an open channel based on what is not being used. In addition, a DSA radio can dynamically move to another channel if the channel it is using is needed by a primary user, such as a licensee or incumbent operator.
[3] White Space Alliance at 27.
[4] White Space Alliance at Exhibit A.

Technology also strongly supported cognitive radio use in this band.[5]

SSC shares these same views that cognitive, or so-called "smart," radios can play an increasingly valuable role in the unlicensed guard bands at issue here in this proceeding. As the leading provider of DSA radio technology, a type of cognitive radio, SSC feels confident that its technology can help maximize the efficient use of the unlicensed, and licensed, VHF and UHF Broadcast bands.

Moreover, SSC agrees with Motorola Mobility, xG Technology, and others who advocated raising power limits for end user devices; Motorola stated that, "the FCC should avoid hamstringing the unlicensed device market,-- the 100 mW power limit for personal portable devices is too low."[6] SSC concurs that the power limits of the TVWS devices need to be raised.

A DSA radio can sense its environment and assign an available channel. Operating at too low of a power level will diminish the value of the cognitive radio, such as DSA, to the end user community in terms of sharing spectrum in an efficient way. The power limit needs to be raised for these unlicensed devices, and it can be done so without causing interference to other, licensed, devices in adjacent bands.

B. Use It or Share It.

SSC supports the numerous commenters who promote the "use it or share it"

[5] xG Technology at 5.
[6] Motorola Mobility at 17. See also, XG Technology at 4.

approach to the licensed bands at issue in this proceeding. Under the "use it or share it" approach, future auctioned and licensed spectrum that is not yet used by licensees should be added to the database and used by unlicensed users until auction winners or licensees are ready to use the spectrum.

For example, the White Space Database Administrator Group stated that "unused TV bands should be available for use by unlicensed users until ready for new purposes".[7] Motorola Mobility added that "unlicensed bands give near term benefits while it will be years before reverse/repacked licenses are deployed."[8] Google/Microsoft agreed: "The FCC should allow unlicensed use in the 600 MHz band when auction winners are not yet in service."[9] Spectrum Bridge also supported the "use it or share it" concept, noting there is a significant amount of spectrum that is licensed but not used today.[10]

SSC agrees. In fact, SSC recently filed Comments in the Commission's 3.5 GHz proceeding, in which SSC reported that it had conducted tests in January 2013, and had observed very little use of the 3.5 GHz band in and around Washington, DC.[11] Moreover, SSC has conducted frequency analysis tests over the past decade, which consistently show that less than 20% of spectrum in major cities is in use; such tests included New York City during the Republican National Convention in 2004, the suburbs of Washington, DC, and downtown Chicago, among other locations.[12]

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[7] White Space Database Group at 3.
[8] Motorola Mobility at 18 and FN 36.
[9] Google/Microsoft at 44
[10] Spectrum Bridge at 5.
[11] Please see, Comments, Shared Spectrum Company, Inc., Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz band, GN Docket No. 12-354 (February 20, 2013) at page 4.
[12] Please see http://www.sharedspectrum.com/papers/spectrum-reports/.

The generally sparse use of licensed spectrum, even in major metropolitan areas like New York City and Chicago, leads to two conclusions: there are opportunities available to the Commission to enable spectrum sharing between licensed and unlicensed operators in most bands, and unlicensed operators should be able to utilize licensed spectrum under the "use it or share it" approach advocated by many commenters in this proceeding. SSC supports this approach to "use it or share it" for spectrum.

C. Unlicensed Spectrum Policy Has Been A Success and Should be Expanded.

There can be no doubt that the FCC's past introduction of unlicensed spectrum on a shared basis has been a huge success for consumers and businesses alike. Motorola Mobility, the Wi-Fi Alliance, Google/Microsoft, the National Cable and Telecommunications Association (NCTA), and the various database operators, all referenced the huge benefits to our economy realized by Wi-Fi and other unlicensed services, such as Mesh networking, Zigbee technology, Bluetooth, etc.

In particular, Wi-Fi, has taken off, with several parties noting the great economic benefits which have resulted to our nation. For example, the NCTA observed that over 100,000 Wi-Fi hotspots have been installed by cable operators nationwide in just the past few years.[13] Motorola Mobility pointed out that the amount of traffic on Wi-Fi from cellular networks doubled from 2011 to 2012.[14]

[13] NCTA at 4.
[14] Motorola Mobility at 3-5.

These same commenters support broad allocations for an unlicensed guard band. For example, NCTA stated that the "FCC should allow unlicensed wi-fi in the portion of the reclaimed 600 MHz broadcast spectrum"[15] and Google /Microsoft concurred that the FCC should "enable unlicensed use in the guard band".[16] The Consumer Electronic Association agreed that unlicensed spectrum is "a hotbed of innovation" and should be allowed in the 600 MHz band.[17] Comcast/NBC Universal noted its enthusiasm for Wi-Fi, and requested a 20 MHz contiguous block for unlicensed use.[18]

SSC supports these comments in favor of more unlicensed guard band spectrum for Wi-Fi and similar uses; there can be no doubt that unlicensed use of the guard band will spur further development of spectrum sharing technologies and improve existing uses of Wi-Fi, Bluetooth, Mesh, and new technologies. The economic benefits to American consumers and businesses will continue to be great.

The Commission should shy away from a hyper technical reading of the law as espoused by a few parties, such as the curiously named "High Tech Spectrum Coalition", in which it argued that the Commission should not encourage high tech unlicensed solutions but instead should implement as narrow a guard band for unlicensed use as possible.[19] As Comcast/NBC Universal point out, the FCC is permitted to not auction spectrum where "technically reasonable" and it has the power to create broader

[15] NCTA at 8.
[16] Google/Microsoft at 34.
[17] Consumers Electronic Association at 32.
[18] Comcast/NBC Universal at 40.
[19] HTSC at 8.

guard bands rather than just those that are "technically necessary."[20] SSC agrees that the Commission's mandate is to allocate spectrum for "the public interest, convenience and necessity," according to Section 309 of the Communications Act of 1934, as amended.[21]

The public interest clearly warrants creation of broad unlicensed guard bands, which will both prevent interference among Broadcast licensees and permit further economic growth through innovation, leading to creation of untold new American jobs in the technology, communications, and software sectors, at a minimum.

This is truly a win-win situation. The tangential benefits of unlicensed guard bands to industries such as hospitality, retail, tourism, transportation, etc. are hard to gauge, but nearly every type of industry, has benefitted from the advent of Wi-Fi, Bluetooth, Zigbee, and Mesh network technologies.

III. CONCLUSION:

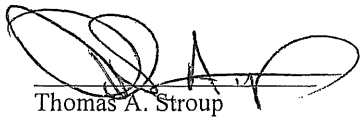
SSC concurs with commenters that the Commission should leverage the intelligence in the radios themselves, including location, sensing, and other capabilities. SSC agree with the White Space Alliance and xG concerning the benefits of cognitive radios overall. SSC agrees with Motorola Mobility, xG Technology and others who stated that the current unlicensed device power limits are too low.

[20] Comcast/NBC Universal at 44.
[21] 47 USC §309.

SSC concurs with the idea of a larger unlicensed block. The economic benefits of more unlicensed usage, coupled with the fact it will be years before repacked and auctioned licenses are put to use, mandates the interim "use it or share it" policy advocated by so many, including Motorola Mobility, Google/Microsoft, Spectrum Bridge, the White Space Alliance, etc. The FCC should promptly move to create guard band rules and give some certainty to the future rules, certainty which will enable innovators to invest money to develop products and services for unlicensed usage.

At Shared Spectrum Company, our main goal is the achievement of effective spectrum sharing. We are pleased to see regulatory policy and technology combining to make this vision a reality.

Respectfully submitted,



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